

its long, sharply pointed, orange to red-orange berries.

This species is most closely related to *A. upalaense*, which differs in having leaves with the collective vein arising from above the middle of the blade, a generally longer peduncle, and a more long-tapered spadix.

An odd collection is *McPherson 8572*, because of its very large size. This collection counts for the parenthetical measurements for cataphyll, petiole, blade, and peduncle lengths in the description.

PANAMA. BOCAS DEL TORO: 15 km S of Changuinola, 300–500 m, *Antonio 3148* (MO); Ojo del Agua, 7 km W of Almirante, 190–220 m, *Croat 38179, 38180* (MO); Milla 7.5, hill above station, 30 m, *Croat & Porter 16416* (MO); 100 m, *Croat 38094* (B, BM, C, CAS, CM, CR, DUKE, F, GH, IBE, K, LE, M, MISSA, MO, NY, P, PMA, QCA, RSA, S, SEL, US, VEN, W); 10 mi. NW of Almirante, 0–100 m, *D'Arcy 11207* (MO); Almirante–Ojo del Agua, 3–6 km W of Almirante, 30–200 m, *Croat 38214* (MO, PMA); Chiriquí Lagoon, Shepherd Island, *von Wedel 2721* (GH, MO); Fortuna Road, Chiriquí Grande–Fortuna, 13.2 mi. W of Chiriquí Grande, 310 m, *Croat & Grayum 60145* (B, MO); 10 mi. from Continental Divide, 120 m, 8°55'N, 82°10'W, *McPherson 8572* (MO); 175 m, *Croat 66820* (MO); Isla Bastimentos, 1–2 km N of Trouble Hole, 30–100 m, *Peterson & Annable 6855* (US); Isla Colón, 0–120 m, *von Wedel 125* (MO), 569 (GH, MO); Río Changuinola, 1 mi. S of Changuinola, *Lazor & Tyson 2661* (MO); Río Cricamola, Finca St. Louis–Konkintoe, 10–50 m, *Woodson et al. 1889* (MO, NY); Río Guarumo, 5 mi. S of Chiriquito, *Lewis et al. 1985* (MO, NY); Water Valley, *von Wedel 708* (MO), 774 (GH, MO), CHIRIQUÍ: Cerro Colorado, along mining road 24 mi. above bridge over Río San Félix, N of village San Félix, 1,430–1,500 m, *Croat 48483* (MO); along mining road 18–27 mi. off of Pan-Am Hwy., above Chamí or turnoff to Escopeta, above San Félix, 1,200–1,500 m, *Croat 33139* (CM, MO, NY); Bocas Road, 1,500 m, *Folsom & Collins 1835* (MO); 28 mi. above San Félix, 9–10 mi. above turnoff to Escopeta, 1,200–1,500 m, *Croat 33257* (MO, PMA); Fortuna Road, Chiriquí Grande–Fortuna, 7.7 mi. W of Chiriquí Grande, 1.5 mi. W of Punta Peña, 80 m, *Croat & Grayum 60090* (MO). SAN BLAS: El Llano–Cartí Road, Nugandí, 19.1 km from Interamerican Hwy., 350 m, *de Nevers 4207* (MO).

Anthurium ranchoanum Engl., Bot. Jahrb. Syst. 25: 421. 1898. TYPE: Costa Rica. Heredia: Rancho Flores in territorio Bacha, Volcán Barba, 2,100 m, *Pittier 2295* (holotype, B; isotypes, BR, G). Figures 262, 265, 266.

Anthurium valerii Standley, Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 137. 1937. TYPE: Costa Rica. Heredia: Vara Blanca, *Valerio 1600* (holotype, F).

Anthurium vinicolor Standley & L. O. Williams, Ceiba 3: 106. 1952. TYPE: Costa Rica. San José: Cordillera de Talamanca near Copey, 1,800 m, L. O. Williams 16538 (holotype, EAP; isotypes, F, US).

Epiphytic or terrestrial; stem to 100 cm long, ca. 1.5–2 cm diam.; leaf scars occasionally conspicuous, 0.7–1 cm high, 1.5–1.7 cm wide; roots moderately numerous, descending, greenish, pubescent, sometimes smooth, moderately thick and elongate, blunt, 3–7 mm diam.; cataphylls subcoriaceous, 6–30 cm long, subrounded at apex with subapical apiculum, green tinged with red, drying tan (B & K yellow-red 9/2.5), persisting semi-intact, eventually deciduous. *Leaves* spreading; petioles 11–150 cm long, 5–15 mm diam., erect-spreading, subterete to nearly D-shaped, shallowly and narrowly sulcate to flattened adaxially, rounded abaxially, the surface faintly pale-speckled; geniculum slightly thicker and paler than petiole, 1.5–3 cm long; blades moderately coriaceous, somewhat pliable, narrowly ovate to ovate-deltoid to ovate-triangular, acuminate at apex (the acumen apiculate), shallowly or deeply lobed at base, 17–64 cm long, 9–34 cm wide, broadest between the base and middle, the margins undulate; anterior lobe 12–29 cm long, the posterior lobes 7–13 cm long; sinus arcuate to parabolic; both surfaces semiglossy to glossy, medium to dark green above, much paler below; midrib bluntly angular to convexly raised above (rarely acutely angular), much paler than surface, round-raised at base, becoming prominently and convexly raised toward the apex, paler than surface below; basal veins 3–6 pairs, 1st usually free to base, 3rd to 6th coalesced 1–2 cm, 4th to 6th coalesced 3.5–6 cm, raised above and below; posterior rib naked, turned up on outer margin; primary lateral veins 4–9 per side, departing midrib at 40–50° angle, broadly arcuate, weakly raised above and below, more so below; interprimary veins flat above, weakly raised below, less conspicuous than primary lateral veins; tertiary veins weakly visible above and below; collective vein arising from one of the primary lateral veins, sometimes from the first basal vein, raised to weakly sunken above, raised below, 2–10 mm from margin. *Inflorescences* erect to erect-spreading, much shorter than leaves; peduncle 13–100 cm long, 5 mm diam., 0.6–0.7 × as long as petiole, green to purplish, terete; spathe spreading, hooded over the spadix, recurved at apex, subcoriaceous, green to green tinged with purple to purple or maroon, lanceolate to narrowly ovate, 4–35 cm long, 2–6.5 cm wide, broadest near the base, acute and apiculate at apex (the acumen tightly inrolled), truncate at base; stipe 1.6 cm long in front, 1.3 cm long in back; spadix pink to red to dark violet-purple to maroon, weakly tapered, 3.5–19 cm long, 9–15 mm diam. near base, 6–9 mm diam. near apex; flowers rhombic, 2–3.2 mm long, 2.6–

3(5) mm wide, the sides jaggedly sigmoid; 5–10 flowers visible in principal spiral, 7–20 in alternate spiral; tepals matte, sparsely punctate, moderately papillate; lateral tepals 1–1.8 mm wide, difficult to discern, the inner margins broadly rounded, the outer margins 3–4-sided; pistils not emergent, pale green; stigma slitlike, ca. 0.5 mm long; stamens emerging promptly throughout in a scattered pattern, becoming prominently exerted, lateral stamens emerging almost to apex before alternates emerge, surmounting tepals; filaments fleshy, somewhat flattened, translucent, ca. 0.5 mm long, ca. 1 mm wide; anthers creamy white to pale orange, ca. 0.6 mm long, 0.7 mm wide; thecae ovoid-ellipsoid, slightly divaricate; pollen yellow to yellow-orange, fading to white, yeasty-scented. *Infructescence* arching-pendent; spathe persisting; spadix to 50 cm long, to 3 cm diam.; berries orange, narrowly obovoid, acute at apex, 12–14 mm long, 6 mm diam.; mesocarp bitter; seeds 1–2 per berry.

Anthurium ranchoanum is found in Costa Rica and Panama at 500 to 2,300 m (usually above 1,000 m), usually in tropical wet, premontane rain and lower montane rain forest life zones.

This species is an atypical member of sect. *Pachyneurium*, recognized by its obtusely sulcate petioles and thick, ovate to ovate-triangular blades with heavy, rather numerous veins. Particularly characteristic is the ovate to lanceolate, hooded spathe which is green tinged with purple and remains stiffly erect. Other distinguishing features include the dark violet-purple, relatively stubby, scarcely tapered, somewhat pendent spadix with tight clusters of white stamens, and the orange berries.

Anthurium ranchoanum is most closely related to *A. cotobrusii*, which differs in having an erect, non-hooding spathe and a markedly tapered spadix which is 10–20× (vs. less than 6×) longer than thick.

Two collections worthy of mention are *Grayum* & *Dickie* 6587 and 6590 which differ from typical collections in having blades drying thinner with less conspicuous tertiary veins, an acute midrib on upper surface and proportionally longer spadix at anthesis. They are perhaps subspecifically distinct.

COSTA RICA. ALAJUELA: Río La Paz Grande, 7.5 km N of Vara Blanca, 1,270–1,350 m, *Croat* 36052 (MO); Sucre–Laguna Pozo Verde, toward Cerro Porvenir, 2,000 m, *Luteyn et al.* 4502 (MO). CARTAGO: Copé, *Williams & Allen* 16538 (US); ridge N of Continental Divide, E of Quebrada Siberia, ca. 2 km E of Villa Mills, *Grayum & Dickie* 6587 (CM, CR, MO), 6590 (CR, MO). HEREDIA: Vara Blanca–Puerto Viejo, 5.5 km N of Vara Blanca,

1,200 m, *Croat* 36053 (MO); headwaters of Río Santo Domingo, 3 km NE of San Rafael de Vara Blanca, N slope Volcán Barva, 2,060 m, 10°15'N, 84°07'W, *Grayum* 7226 (MO); 1 km NE of Los Cartagos, 2,100 m, *Lent* 1898 (MO); Cerro Chompipe–SW flank of Volcán Barva, N of Hwy. 113 connecting with Calle Gallito, 2,000–2,100 m, 10°7'N, 84°5'W, *Baker et al.* 239 (MO); Monte Cristo, 1,720 m, *Rojas* 511 (MO); slopes of Volcán Barva, above San Rafael and Uvita, along Río Segundo, 1,900–2,000, 10°05'N, 84°05'W, *Berringer & Schatz* 2039 (MO); Parque Nacional Braulio Carrillo, San Rafael de Vara-Blanca, 1,830 m, 10°11'50"N, 84°6'35"W, *Herrera* 242 (MO), 244 (MO); 1,800 m, 266 (MO); 2,000 m, 228 (MO); NNW of Heredia, *Lelinger & White* 981, 1012 (US); road to Sacramento, *Utey & Utey* 4564 (DUKE); San Isidro, *Pittier* 14058 (US), *Standley & Valerio* 50243, 50798, 51455, 51620, 52345 (US); N of San Rafael, *Lems s.n.* (K, NY); Braulio Carrillo Park, Zurquí, 1,700–2,000 m, *Gomez* 20103, 20221 (CR, MO), 20225 (B, CR, F, K, MO); Cerro Caricias and Cerro Zurquí, S slopes, bordering Quebrada Caricias, NE of Heredia, 1,600–1,800 m, *Luteyn* 3275 (MO); Cerro Chompipe, *Luteyn & Wilbur* 4422 (DUKE); N slope, San Rafael–Río Las Vueltas, 2,100–2,200 m, 10°5'N, 84°4'W, *Stevens* 13980 (MO); Río Vueltas, upper Río Patria, E slopes of Volcán Barva, Continental Divide, 2,000 m, 10°6'N, 84°4'W, *Burger & Liesner* 6369 (MO); Volcán Barva, *Pittier* 2295 (BR), *Skutch* 3657 (MICH, US). PUNTARENAS: Cantón de Coto Brus, cultivated at Las Cruces Tropical Botanical Garden, 1,200 m, *Croat* 44443, 57242 (MO); Monteverde, Río Guacimal, below Lechería, 1,500 m, 10°17'N, 84°48'W, *Hammel & Trainer* 13816 (MO); near E edge of Monteverde Reserve, 1,350 m, *Croat* 47130 (MO); 1,450 m, *Haber* 4071, 4086, 4087 (MO); Río San Luis, 1,000 m, *Haber et al.* 4975, 5016 (MO). SAN JOSÉ: N of San Isidro del General, *Utey* 407 (DUKE); 5 km SW of Empalme on road to Santa María de Dota, 2,000 m, *Antonio* 721 (MO); S of Santa María de Dota, *Luteyn* 3324 (DUKE), *Standley* 41767 (US), *Standley & Valerio* 44077 (US); Santa Rosa del Copey, *Tonduz* 12266, 12267, 12269 (US); Río Cascajal, 3 km NE of Cascajal, 1,680 m, *Lent* 2181 (MO). PANAMA. BOCAS DEL TORO: Cerro Colorado, along road between Río San Felix and mining exploration camp, 7 mi. W of Chamí, along trail through Guaymí village, 1,500 m, *Croat* 69211 (MO); Cerro Pate Macho, NW ridge, from summit to Finca Serrano, 1,200–2,100 m, *Sytisma et al.* 4949 (MO). BOCAS DEL TORO & CHIRIQUI: ridge of Continental Divide, NE of Cerro Pate Alto, 2,200 m, 8°47'N, 82°21'W, *Knapp & Schmalzel* 4755 (MO). CHIRIQUI: Cerro Horqueta, Cordillera de Talamanca, above Boquete, 1,860–1,940 m, 8°49'N, 82°29'W, *Cochrane et al.* 6264 (MO); NW of Boquete, 1,660–1,930 m, *Herrera* 545 (MO); Cerro Hornito, 1,400–1,750 m, *Folsom et al.* 7224 (MO); 1,750–1,900 m, 8°41'N, 82°10'W *Croat* 67985 (MO); Cerro Hornito summit, above Los Planes de Hornito, 2,100–2,230 m, *Hammel* 6217 (MO), *Knapp et al.* 4202 (MO); Cerro Horqueta, *Dwyer et al.* 545 (GH, MO, US); Cerro Pando, E slopes, 2,000–2,300 m, 8°55'N, 82°44'W, *Knapp* 1653 (K, MO); Cerro Pate Macho, Continental Divide, NE of Cerro Pate Macho, Bocas del Toro border, above Palo Alto, 2,200 m, 8°47'N, 82°21'W, *Knapp et al.* 4240 (MO); along Continental Divide, NE of Boquete, 1,800–2,200 m, *Croat* 485194 (CM, MO), *Croat* 48553 (MO), *Croat* 66407 (MO); Cerro Punta, 2.7 mi. NW of Río Chiriquí Viejo, Las Nubes, 2,200 m,

Liesner 326 (MO, PMA); Fortuna Road, 1,300 m, *McPherson* 8779 (B, MO, NY, PMA); Fortuna Dam, ridge 7 mi. N of Los Planes de Hornito, 1,000 m, *Knapp et al.* 4177 (MO); Gualaca-Fortuna Dam, 5.9 mi. NW of Los Planes de Hornito, 1,370 m, *Croat* 49846 (MO); Fortuna Dam, 1,200–1,400 m, *Hammel* 2113 (MO); Río Palo Alto headwaters, 0.5 km E of Cerro Pate Macho, 1,800–2,100 m, 8°47'N, 82°21'W, *Knapp et al.* 2120 (MO); Dto. Bugaba, Cerro Pando, Santa Clara, 8°50'N, 82°44'W, *van der Werff & Herrera* 7275 (MO, PMA, RSA).

Anthurium reflexinervium Croat, sp. nov. TYPE:

Peru. Huánuco: Prov. Leoncio Prado, Dto. Rupa Rupa, Tingo María, vic. of airport, 750–800 m, *Plowman & Ramírez* 7585 (holotype, MO 2743714; isotypes, F, K, NY, SEL). Figures 267, 268, 271.

Planta epilithica; internodia brevia, 1–3 cm diam.; cataphyllum late lanceolato-trigonum; petiolus 3–8 cm longus, (4)6–12 mm diam., trigonus, aliquando D-formatus; lamina late oblanceolato-elliptica, 41–72 cm longa, (10.5)13–18 cm lata; nervis primariis lateralibus 23–26(35) utroque, manifeste retrorse arcuati; pedunculus 18–40 cm longus, 3–6 mm diam.; spatha lanceolato-ovata aut oblongo-lanceolata aut oblongo-elliptica, 4.5–9 cm longa, 0.7–2.1 cm lata; stipes ad 5 mm liber; spadix contractus, 6–11 cm longus, basi 5–9 mm diam., apice 2–5 mm diam., rubellus-violaceus ad atrorubellum-purpureum. Baccae rubro-violaceae, 8 mm longae.

Epilithic; stem usually less than 15 cm long, 1–3 cm diam.; leaf scars 0.7 cm high, 1 cm wide; roots dense, ascending to descending, brown, smooth to tomentose, weakly tapered, 3–4 cm long, 3–5 mm diam.; cataphylls subcoriaceous, broadly lanceolate-triangular, (2)4–4.5 cm long, acute at apex, drying dull brown, persisting semi-intact, quickly dilacerating and persisting as fine linear fibers, splitting at apex. *Leaves* erect to spreading; petioles 3–8 cm long, (4)6–12 mm diam., broadly and sharply triangular, sometimes sharply D-shaped, flattened, sometimes with a medial rib adaxially, the margins winged and undulate, prominently and sharply angular to rounded abaxially; geniculum scarcely to moderately thicker than petiole, 0.5–1 cm long; sheath 2–3.5 cm long; blades coriaceous to subcoriaceous, broadly oblanceolate-elliptic, acute at apex, obtuse to shallowly cordate at base, 41–72 cm long, (10.5)13–18 cm wide, broadest at or above the middle, the margins sometimes concave toward the base, moderately to strongly undulate; upper surface matte to semiglossy, dark green, lower surface semiglossy, paler; both surfaces strongly bullate and quilted; midrib flat and with a sharp rib at base, becoming acutely raised and higher than broad toward the apex above, acutely raised, higher than broad and 1-ribbed to winged below; primary lateral veins 22–26(35) per side,

departing midrib at acute to obtuse angle, spreading retrorsely at 30–70° angle, conspicuously arcuate to the collective vein, narrowly raised in deep grooves above, less so below, knife-edge-like when dried below, less so above; interprimary veins few, almost as conspicuous as primary lateral veins; tertiary veins weakly raised to flat below, weakly visible above and below when dried; reticulate veins obscure to conspicuous when dried, flat; collective vein arising from near the apex, about the middle of the blade or near the base, equally as prominent as major tertiary veins, 2–5 mm from margin. *Inflorescences* erect; peduncle 15–40 cm long, 3–7 mm diam., 2.8–8(11)× as long as petiole, olive-green to dark green, terete with a diminishing rib, firm; spathe ascending to reflexed, sometimes recurved, subcoriaceous to coriaceous, olive-green to pale olive-green, tinged with red to uniformly dark green, lanceolate-ovate to oblong-lanceolate to oblong-elliptic, 4.5–9 cm long, 0.7–2.4 cm wide, broadest near the base, inserted at 45–80° angle on peduncle, abruptly acuminate at apex (the acumen tightly inrolled and cuspidate, 2–3 mm long), narrowly acute to obtuse to rounded at base, the margins meeting at 80° angle; stipe ca. 6–13(20) mm long in front, 1–6 mm long in back; spadix red-violet to dark red-purple (B & K purple 4/7.5), tapered, erect, somewhat curved, 6–11 cm long, 5–10 mm diam. near base, 2–5 mm diam. near apex, broadest at the base; flowers ± square, 2.0–2.5 mm long when fresh, drying 1.9–2.4 mm long, 2.5–3.7 mm wide when fresh, drying 1.7–1.9 mm wide, the sides straight to smoothly or jaggedly sigmoid; 5–9 flowers visible in principal spiral, 4–14 in alternate spiral; tepals densely and minutely papillate; lateral tepals 1.1–2 mm wide, the inner margins ± straight to broadly convex, weakly erose, the outer margins 2–3-sided; pistils weakly raised, greenish, somewhat papillate; stigma slitlike, becoming broadly ellipsoid to nearly circular, 0.4–0.5 mm long, depressed medially with the margins somewhat raised when fresh, drying slightly sunken and blackish; stamens emerging rapidly in a complete sequence, the laterals preceding the alternates by 6–14 spirals, 3rd preceding 4th by 1–2 spirals, held at the sides of the pistil; anthers yellow, 0.5–0.9 mm long, 0.7–1.0 mm wide; thecae ovoid-ellipsoid, not divaricate. *Inflorescence* with spathe green, persisting; berries reddish violet, 8 mm long.

Anthurium reflexinervium is known only from the vicinity of Tingo María in Huánuco, Peru, at 650 to 800 m, on rocky slopes near the Río Huallaga, in a premontane tropical moist-tropical moist forest transitional life zone.